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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

KYLE, MICHAEL J

ART UNIT	PAPER NUMBER
3676	

DATE MAILED: 11/10/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/052,353

Applicant(s)

KONO, TORU

Examiner

Michael J Kyle

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 October 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-7 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-7 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 1/23/02 and 6/26/03 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____. 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bagepalli et al (U.S. Patent No. 6,030,175). Bagepalli et al discloses a brush seal device in which splitting surfaces (48, 50, 56, 58, 60, 62, in figures 2, 3, and 4) of a plurality of split body parts (10, 12, 14, 16, 18, 20) are combined with one another and which is mounted to one of opposed component members (78) so as to seal a gap between the component members (76, 78). The examiner identifies items 48, 50, 56, 58, 60, and 62 as the splitting surfaces. In figures 2 and 3, these surfaces are only shown on one split body part (10). Because each of the other split body parts (12, 14, 16, 18, 20) are identical (column 4, line 46), they have similar splitting surfaces. The brush seal device comprises a brush seal (32) formed in a wall shape, split body parts (10, 12, 14, 16, 18, and 20) which hold the brush seal and each of which has connecting portions (30) that are split and that extend along the splitting surfaces wherein in each of the splitting surfaces has not only an axial step, but also a radial step. The examiner refers to figure 2 of Bagepalli et al, which shows an axial step (in the direction of 42) between body parts (26, 28), and a radial step between parts (26, 28) and (30), along the splitting surfaces. The examiner notes that surfaces 50, 58, and 62 comprise a single splitting surface, and surfaces 48, 56, and 60 comprise

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another splitting surface. Furthermore, Bagepalli et al discloses the splitting surfaces (48, 50, 56, 58, 60, 62) to be formed at both sides of the brush seal (32). Bagepalli et al does not explicitly disclose a circumferential clearance between the splitting surfaces of the split body parts.

3. However, circumferential clearance gaps are inherent in segmented seals like Bagepalli's that are used in rotary machines. One having ordinary skill in the art would recognize that a circumferential clearance exists between the split body parts of Bagepalli et al due to the thermal expansion and contraction of the segments that occurs during normal use of the rotary machine. The circumferential clearance is interrupted by the radial step (between parts 26, 28 and 30, along radial direction 38). Therefore, it is well known to one having ordinary skill in the art that a clearance exists between split body parts of a segmented seal in rotary machines.

4. Claims 1, 2, 4, 5, and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bagepalli et al (U.S. Patent No. 6,030,175) in view of Tong (U.S. Patent No. 6,431,550). Bagepalli et al discloses a brush seal device in which splitting surfaces (48, 50, 56, 58, 60, 62) of a plurality of split body parts (10, 12, 14, 16, 18, 20) are combined with one another and which is mounted to one of opposed component members (78) so as to seal a gap between the component members (76, 78) comprising a brush seal (32) formed in a wall shape in the longitudinal direction of a fixture portion (64) which is fixed at one end thereof, the split body parts that hold the brush seal (32) and each of which has connecting portions (30) that are split and that extend along the splitting surfaces. Bagepalli et al also discloses each of the splitting surfaces is composed of splitting direction extending surfaces that extend in such a direction as to split the split body parts and a longitudinal surface that extends in the longitudinal direction of the split body parts (26, 28) and that forms a step interposed between the splitting direction extending

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surfaces (figure 1, surfaces 58 and 50 form a step). Bagepalli et al does not disclose that each of the splitting direction-extending surfaces has shutoff means for sealing a gap between the splitting direction extending surfaces that are combined with each other.

5. Tong teaches shutoff means (52) for sealing a gap between splitting direction extending surfaces that are combined with each other (figure 4), in order to prevent leakage through a potential gap between seal ring segments. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Bagepalli et al as taught by Tong in order to prevent leakage through a potential gap between seal ring segments. In addition, Tong teaches the shut off means (52) has longitudinal contact surfaces formed in a step structure (60, 62) of splitting direction extending surfaces and is constructed in a joining portion where the contact surfaces are joined with each other.

6. With respect to claims 4 and 5, Tong teaches that the shutoff means is constructed of an elastic sealing plate that extends across and shut off the gap between opposed faces of the splitting direction extending surfaces. The examiner considers the brush seal (52) of Tong, as a whole, to form a plate. Tong also teaches the shutoff means (52) is constructed of an elastically deformable plate sealing portion that is disposed between opposed faces of the splitting direction extending surfaces so as to shut off the gap therebetween and that is joined with the opposed faces.

7. With respect to claim 7, Bagepalli et al discloses a brush seal device in which splitting surfaces (48, 50, 56, 58, 60, 62) of a plurality of split body parts (10, 12, 14, 16, 18, 20) are combined with one another and which is mounted to one of opposed component members (78) so as to seal a gap between the component members (76, 78) comprising a brush seal (32)

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formed in a wall shape, the split body parts (26, 28, 30) which hold the brush seal and each of which has connecting portions (30) that are split and that extend along the splitting surfaces, and that each splitting surface has an axial step (between body parts 26 and 28). Bagepalli et al does not disclose that sealing means are disposed between opposed faces of splitting direction extending surfaces of the splitting surfaces.

8. Tong teaches sealing means (52) disposed between opposed faces of splitting direction extending surfaces of the splitting surfaces for sealing a gap between splitting direction extending surfaces that are combined with each other (figure 4), in order to prevent leakage through a potential gap between seal ring segments. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Bagepalli et al as taught by Tong in order to prevent leakage through a potential gap between seal ring segments.

9. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bagepalli et al in view of Tong as applied to claim 2 above, and in further view of Julien et al (U.S. Patent No. 5,226,683). Neither Bagepalli et al nor Tong discloses the shut off means has a sealing plate made from a super-elastic alloy material on the contact surfaces.

10. Julien et al teaches the use of a sealing plate made from a super-elastic alloy material in order to provide a seal that can be reused many time without losing it sealing effectiveness (column 1, lines 42-45). Therefore, it would have been obvious to one of ordinary skill in the art to modify the seal of Tong as taught by Julien et al in order to provide a seal that can be reused many times without losing its sealing effectiveness

Response to Arguments

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11. Applicant's arguments filed October 17, 2003 have been fully considered but they are not persuasive. Examiner has modified the rejections based on Bagepalli et al to more clearly identify the features of Bagepalli et al that meet the limitations set forth in the claims.

With respect to claim 6, applicant argues that Bagepalli et al fails to disclose connecting portions that are split and extend along the splitting surfaces. Examiner has modified the rejection under Bagepalli et al so that the split body portions are now identified as 10, 12, 14, 16, 18, and 20 (in the previous Office action, examiner identified the split body portions as 26, 28 and 30).

Examiner still considers feature 30 of Bagepalli et al to meet the limitations of the connecting portions set forth in the present application. The connecting portion (30) of

12. Bagepalli et al is split (circumferentially) and extends along the splitting surfaces (axially). Applicant also states that Bagepalli et al fails to disclose the splitting surfaces to have an axial and radial steps. Examiner asserts Bagepalli discloses both of these features. An axial step is shown between portions 26 and 28 along direction 42 in figure 2. A radial step is shown along direction 38 between portions 30 and 28, and also portions 30 and 26.

13. With respect to claims 1, 2, 4, 5, and 7, applicant argues that Tong fails to cure the deficiency of Bagepalli et al by failing to disclose split body parts having connecting portions that are split and extend along the splitting surface. Examiner asserts that the features are disclosed by Bagepalli et al as discussed above. Tong is relied upon for the teaching of a shut off means.

14. With respect to claims 1, 2, 4, and 5, applicant argues that there is no motivation provided to combine Bagepalli et al and Tong. Applicant's argument relies upon the assertion that because a gap or clearance is not disclosed in Bagepalli et al, that one does not exist. Gaps

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between segmented seals are common and well known in the art. Thermal expansion and contraction of the seal segments caused by normal use of a rotary machine in which the seals are used, causes gaps or clearances between the segments. Tong solves the problem of leakage through the segments by providing a seal between the segments.

15. With respect to claim 7, applicant argues that splitting surfaces 48, 50, 56, 58, 60 and 62 of Bagepalli et al do not have an axial step. As discussed above, in the axial direction (42) of Bagepalli et al, a step exists between portions 26 and 28. Applicant also argues that there is no motivation to combine Bagepalli et al and Tong. Examiner refers to discussion above regarding claims 1, 2, 4, and 5 to show a proper a motivation for the combination.

16. With respect to claim 3, applicant argues that Julien fails to cure the deficiencies of Bagepalli et al and Tong. Examiner notes that Bagepalli et al and Tong recite all of the limitations of independent claim 1 (from which claim 3 depends) as discussed above. Julien is used to teach the use of super-elastic alloy material.

Conclusion

17. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael J Kyle whose telephone number is 703-305-3614. The examiner can normally be reached on Monday - Friday, 8:30 am - 5:00 pm.

18. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Anthony Knight can be reached on 703-308-3179. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

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19. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-2168.

mk



Anthony Knight
Supervisory Patent Examiner
Technology center 3600